

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A liquid crystal display (LCD) device, comprising:
an LCD panel having a plurality of data lines;
a control chip;
a sampling switch array coupled to the data lines and the control chip, wherein the control chip applies video signals to the data lines via the sampling switch array; and
a switch controller coupled to the sampling switch array and the control chip, wherein the switch controller alternately applies a first turn on pulse having a first absolute value and a second turn-on pulse having a second absolute value to the sampling switch array in accordance with a polarity of the video signals applied from the control chip, and
wherein the first absolute value is different from the second absolute value.
2. (Previously Presented) The liquid crystal display device according to claim 1, wherein the control chip includes a plurality of data supply lines that applies the video signals to the sampling switch array and the switch controller, wherein m number of video signals are sequentially supplied to each of the plurality of data supply lines, and wherein m is an even integer greater than 1.
3. (Original) The liquid crystal display device according to claim 2, wherein the sampling switch array includes a plurality of switching blocks connected to a corresponding one of the plurality of data supply lines, wherein each of the switching blocks includes m number of switching devices, and wherein the each of the switching devices divides the m number of video signals and applies the divided video signals to the plurality of data lines.
4. (Original) The liquid crystal display device according to claim 3, wherein the switch controller sequentially turns the switching devices on, wherein the video signals are applied to the switching devices that are turned on.

5. (Canceled)

6. (Previously Presented) The liquid crystal display device according to claim 4, wherein

the switching devices comprise PMOS transistors;

the switching controller applies the first turn-on pulse to the switching devices upon receipt of a video signal having a positive polarity; and

the switching controller applies the second turn-on pulse to the switching devices upon receipt of a video signal having a negative polarity.

7. (Currently Amended) A liquid crystal display (LCD) device, comprising:

an LCD panel having a plurality of data lines;

a control chip;

a sampling switch array coupled to the data lines and the control chip, wherein the control chip applies video signals to the data lines via the sampling switch array; and

a switch controller coupled to the sampling switch array and the control chip, wherein the switch controller alternately applies a first turn on pulse having a first absolute value and a second turn-on pulse having a second absolute value to the sampling switch array in accordance with a polarity of the video signals applied from the control chip,

wherein the control chip includes a plurality of data supply lines that applies the video signals to the sampling switch array and the switch controller, wherein m number of video signals are sequentially supplied to each of the plurality of data supply lines, wherein m is an even integer greater than 1,

wherein the sampling switch array includes a plurality of switching blocks connected to a corresponding one of the plurality of data supply lines, wherein each of the switching blocks includes m number of switching devices, and wherein the each of the switching devices divides the m number of video signals and applies the divided video signals to the plurality of data lines,

wherein the switch controller sequentially turns the switching devices on, wherein the video signals are applied to the switching devices that are turned on, and the switching devices comprise PMOS transistors,

wherein the switching controller applies the first turn-on pulse to the switching devices upon receipt of a video signal having a positive polarity; and the switching controller applies the second turn-on pulse to the switching devices upon receipt of a video signal having a negative polarity, and

~~The liquid crystal display device according to claim 6~~, wherein
the first turn-on pulse comprises a voltage drop from a first voltage value to a second voltage value, wherein the first voltage value has a positive polarity and the second voltage value has a negative polarity; and
the second turn-on pulse comprises a voltage drop from the first voltage value to a third voltage value, wherein the third voltage value has a negative polarity, and wherein an absolute value of the third voltage value is greater than an absolute voltage value of the second voltage value.

8. (Original) The liquid crystal display device according to claim 7, wherein the switch controller includes m number of pulse suppliers, wherein the pulse suppliers selectively apply first and second turn-on pulses to each of the m switching devices.

9. (Original) The liquid crystal display device according to claim 8, wherein each of the pulse suppliers includes:

a first level shifter that generates the first turn-on pulse via the first and second voltage values;

a second level shifter that generates the second turn-on pulse via the first and third voltage values;

a comparator that compares a voltage value of a common voltage with a voltage value of the video signal; and

a selector that applies one of the first and second turn-on pulses to the switching devices in accordance with a selection signal output by the comparator.

10. (Original) The liquid crystal display device according to claim 9, wherein
the comparator applies a first selection signal to the selector when the voltage value of the video signal is greater than the voltage value of the common voltage; and

the comparator applies a second selection signal to the selector when the voltage value of the video signal is less than the voltage value of the common voltage.

11. (Original) The liquid crystal display device according to claim 10, wherein the selector applies the first turn-on pulse when the output selection signal comprises the first selection signal; and

the selector applies the second turn-on pulse when the output selection signal comprises the second selection signal.

12. (Original) The liquid crystal display device according to claim 1, wherein the switch controller is arranged within the LCD panel.

13. (Original) The liquid crystal display device according to claim 1, wherein the switch controller is arranged within a printed circuit board.

14. (Original) The liquid crystal display device according to claim 9, wherein the selector is arranged within the LCD panel; and the comparator, the first level shifter, and the second level shifter are arranged within a PCB.

15. (Original) The liquid crystal display device according to claim 8, wherein each of the pulse suppliers includes:

a comparator that compares a voltage value of a common voltage with a voltage value of the video signal;

a selector that receives the second and third voltage values and that applies one of the second and third voltage values in accordance with a selection signal output by the comparator; and

a level shifter that receives the first voltage value and that applies one of the first and second turn-on pulses to the switching devices and the voltage value applied by the selector.

16. (Original) The liquid crystal display device according to claim 15, wherein

the comparator applies a first selection signal to the selector when the voltage value of the video signal is greater than the voltage value of the common voltage; and

the comparator applies a second selection signal to the selector when the voltage value of the video signal is less than the voltage value of the common voltage.

17. (Original) The liquid crystal display device according to claim 16, wherein the selector applies the second voltage value when the output selection signal comprises the first selection signal; and

the selector applies the third voltage value when the output selection signal comprises the second selection signal.

18. (Original) The liquid crystal display device according to claim 17, wherein the level shifter applies the first turn-on pulse when the voltage value applied by the selector comprises the second voltage value; and

the level shifter applies the second turn-on pulse when the voltage value applied by the selector comprises the third voltage value.

19. (Previously Presented) The liquid crystal display device according to claim 4, wherein

the switching devices comprise NMOS transistors;

the switching controller applies the first turn-on pulse to the switching devices upon receipt of a video signal having a positive polarity; and

the switching controller applies the second turn-on pulse to the switching devices upon receipt of a video signal having a negative polarity.

20. (Original) The liquid crystal display device according to claim 19, wherein the first turn-on pulse comprises a voltage rise from a first voltage value to a second voltage value, wherein the first voltage value has a negative polarity and the second voltage value has a positive polarity; and

the second turn-on pulse comprises a voltage rise from the first voltage value to a third voltage value, wherein the third voltage value has a positive polarity, and wherein an absolute value of the third voltage value is less than an absolute voltage value of the second voltage value.

21. (Original) The liquid crystal display device according to claim 20, wherein the switch controller includes m number of pulse suppliers, wherein the pulse suppliers selectively apply first and second turn-on pulses to each of the m switching devices.

22. (Currently Amended) The liquid crystal display device according to claim 21, wherein each of the pulse suppliers ~~includes~~ include:

a first level shifter that generates the first turn-on pulse via the first and second voltage values;

a second level shifter that generates the second turn-on pulse via the first and third voltages values;

a comparator that compares a voltage value of a common voltage with a voltage value of the video signal; and

a selector that applies one of the first and second turn-on pulses to the switching devices in accordance with a selection signal output by the comparator.

23. (Original) The liquid crystal display device according to claim 22, wherein the comparator applies a first selection signal to the selector when the voltage value of the video signal is greater than the voltage value of common voltage; and

the comparator applies a second selection signal to the selector when the voltage value of the video signal is less than the voltage value of the common voltage.

24. (Original) The liquid crystal display device according to claim 23, wherein the selector applies the first turn-on pulse when the output selection signal comprises the first selection signal; and

the selector applies the second turn-on pulse when the output selection signal comprises the second selection signal.

25. (Original) The liquid crystal display device according to claim 21, wherein each of the pulse suppliers includes:

a comparator that compares a voltage value of a common voltage with a voltage value of the video signal;

a selector that receives the second and third voltage values and for applying one of the second and third voltage values in accordance with a selection signal output by the comparator; and

a level shifter that receives the first voltage value and for applying one of the first and second turn-on pulses to the switching devices and the voltage value applied by the selector.

26. (Original) The liquid crystal display device according to claim 25, wherein the comparator applies a first selection signal to the selector when the voltage value of the video signal is greater than the voltage value of the common voltage; and

the comparator a second selection signal to the selector when the voltage value of the video signal is less than the voltage value of the common voltage.

27. (Original) The liquid crystal display device according to claim 26, wherein the selector applies the second voltage value when the output selection signal comprises the first selection signal; and

the selector applies the third voltage value when the output selection signal comprises the second selection signal.

28. (Original) The liquid crystal display device according to claim 27, wherein the level shifter applies the first turn-on pulse when the voltage value applied by the selector comprises the second voltage value; and

the level shifter applies the second turn-on pulse when the voltage value applied by the selector comprises the third voltage value.

29. (Currently Amended) A method of driving a liquid crystal display (LCD) device [[,]] including a plurality of switching blocks, each of which includes m number of switches and

a switch controller supplying a control signal to each of the switches, wherein m represents an even integer greater than 1, the method comprising:

applying m number of video signals to a plurality of switching blocks; and

alternately applying a first turn-on pulse or a second turn-on pulse to each of the switches to turn on the switches sequentially and applying the video signals to the data lines connected to the turned on switches,

wherein each of the first turn on pulse and the second turn on-pulse includes a corresponding voltage change from a first voltage value that is one of a voltage drop or a voltage rise from the first voltage value, the magnitude of the voltage change for the first turn-on pulse having a different size than the voltage change for the second turn-on pulse.

30. (Original) The method according to claim 29, wherein the switches comprise PMOS transistors;

the first turn-on pulse comprises a voltage drop from a first voltage value to a second voltage value, wherein the first voltage value has a positive polarity and the second voltage value has a negative polarity; and

the second turn-on pulse comprises a voltage drop from the first voltage value to a third voltage value, wherein the third voltage value has a negative polarity, and wherein an absolute value of the third voltage value is greater than an absolute value of the second voltage value,.

31. (Original) The method according to claim 30, wherein

the first turn-on pulse is applied to the switches upon receipt of a positive video signal by the switches; and

the second turn-on pulse is applied to the switches upon receipt of a negative video signal by the switches.

32. (Original) The method according to claim 29, wherein

the switches comprise NMOS transistors;

the first turn-on pulse comprises a voltage rise from a first voltage value to a second voltage value, wherein the first voltage value has a negative polarity and the second voltage value has a positive polarity; and

the second turn-on pulse comprises a voltage rise from the first voltage value to a third voltage value, wherein the third voltage value has a positive polarity, and wherein an absolute value of the third voltage value is less than an absolute value of the second voltage value.

33. (Original) The method according to claim 32, wherein
- the first turn-on pulse is applied to the switches upon receipt of a negative video signal by the switches; and
- the second turn-on pulse is applied to the switches upon receipt of a positive video signal by the switches.